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PORTABLE RADIO EQUIPMENT  
[Keitai musen sochi]

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## 1. Title of the Invention

Portable Radio Equipment

## 2. Claim(s)

[Claim 1] A portable radio equipment comprising a radio part for receiving and demodulating a radio signal including a call signal, a collating part that collates a call number included in said demodulated call signal with a user's own individual number being set up beforehand and generates an incoming call notification signal when these numbers agree with each other, an alerting part for notifying an incoming call, and a CPU which arranges said alerting part to carry out said incoming call notification upon reception of said incoming call notification signal;

wherein said portable radio equipment also comprises a first memory element provided for setting up specific caller numbers beforehand and a function for sending this caller number to said CPU from said collating part when the caller number is included in the demodulated call signal,

wherein said CPU compares said caller number sent from said collating part with the caller number set up in said first memory element and arranges said alerting part to carry out said incoming call notification in such a way that the notification for the matching numbers can be differentiated from the non-matching numbers.

[Claim 2] The portable radio equipment according to Claim 1

wherein said alerting part is equipped with at least a character display element for displaying characters and a ringing element for making a ring tone, and said CPU controls the incoming call notification in such a way that a light emitting element emits light differently for matching numbers from non-matching numbers and a ringing element generates a ring differently for matching numbers from non-matching numbers.

[Claim 3] The portable radio equipment according to Claim 2 wherein the portable radio equipment is further equipped with a second memory element for registering the character data corresponding to the set-up caller numbers, and when said CPU determines that said two caller numbers match with each other, the character data corresponding to said caller number is read from the second memory element and displayed on said character display element at the time of incoming call notification.

### 3. Detailed Explanation of the Invention

#### [0001] [Industrial Application]

This invention pertains to a portable radio device such as telephone for a digital mobile telephone system and is particularly associated with an improvement of incoming call notification.

#### [0002] [Description of the Prior Art]

This type of conventional portable radio device is explained below by referring to the block diagram shown in Fig. 4.

[0003] Through an antenna 401, this portable radio device

receives a radio signal from a wireless base station (not shown) of a mobile communication system to which this portable radio device belongs. This radio signal includes a call signal of this portable radio device or another portable radio device having the same function. The aforementioned call signal containing a plurality of data includes a call number of desired portable radio device and may also include a caller number of the caller who is calling this portable radio device.

[0004] The radio signal having been received by the antenna 401 is supplied to a wireless section 402. The wireless section 402 carries out signal reception procedures, such as frequency conversion, amplification, demodulation, etc., with the radio signal and supplies the demodulated call signal to a collating part 403. The collating part 403 compares the call number included in the call signal with the self-individual number being set up in a memory element 404 beforehand. When the collated result indicates that both numbers are matching, the collating part 403 judges that the self-station (self-portable radio device) has received a call and outputs an incoming call notice signal to a CPU (microprocessor) 405.

[0005] Upon reception of the incoming call notification signal, the CPU 405 outputs an incoming call alerting drive signal in order to make the alerting part carry out an incoming call notification process. The aforementioned alerting part comprises a character display element 406, a light emitting element 407, and a ring element

408. Once the incoming call alerting drive signal is received, the character display element 406, the light emitting element 407, and the ring element 408 carry out respective incoming call notifications. That is, upon reception of an incoming call notification drive signal, the character display element 406 displays an incoming call with a fixed display content while the light emitting element 407 emits a light with a preset light emitting pattern, and the ring element 408 generates rings of a ringing pattern consisting of a preset ringing frequency, volume, etc.

[0006] Note that this portable radio device includes a setting part 410 for setting data, such as calling number and the like, incorporated with a keypad or the like so that an outgoing call can be made to another subscriber.

[0007] [Problem(s) to be Solved by the Invention]

Since the conventional portable radio device mentioned above carries out an incoming call notification at the time of receiving a call (incoming call) using a fixed display which does not discriminate callers, a preset light-emission pattern, and a preset ring pattern, a user cannot recognize the caller (caller) when an incoming call is received.

[0008] Therefore, the user must respond to incoming calls, which are not expected calls to the user, such as unwanted calls.

[0009] The portable radio device may be used in public places, such as in a train. However, although a user cannot know whether or

not the call was made by an important person unless responding to the call, responding to every incoming call is not desirable in the public place.

[0010] Also, when the ringer volume is set in muted mode, even if the incoming call is made by a specific important caller, a user may not notice the call, as a ring is not generated for the incoming call.

[0011] [Means for Solving the Problem]

To solve the problems, this invention provides a portable radio equipment comprising a radio part for receiving and demodulating a radio signal including a call signal, a collating part that collates a call number included in said demodulated call signal with a user's own individual number being set up beforehand and generates an incoming call notification signal when these numbers agree with each other, an alerting part for notifying an incoming call, and a CPU that arranges said alerting part to carry out said incoming call notification upon reception of said incoming call notification signal;

wherein said portable radio equipment also comprises a first memory element provided for setting up specific caller numbers beforehand and a function for sending this caller number to said CPU from said collating part when the caller number is included in the demodulated call signal, wherein said CPU compares said caller number sent from said collating part with the caller number set up in said

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first memory element and arranges said alerting part to carry out said incoming call notification in such a way that the notification for the matching numbers can be differentiated from the non-matching numbers.

[0012] With the aforementioned portable radio equipment, said alerting part is equipped with at least a character display element for displaying characters and a ringing element for making a ring tone, and said CPU controls the incoming call notification in such a way that a light emitting element emits light differently for matching numbers from non-matching numbers and a ringing element generates a ring differently for matching numbers from non-matching numbers.

[0013] With the aforementioned portable radio equipment, the portable radio equipment is further equipped with a second memory element for registering the character data corresponding to the set-up caller numbers, and when said CPU determines that said two caller numbers match with each other, the character data corresponding to said caller number is read from the second memory element and displayed on said character display element at the time of incoming call notification.

[0014] [Embodiment]

Next, this invention is explained with reference to the figures.

[0015] Fig. 1 is a block diagram showing an example of this invention.



[0016] Through an antenna 101, this portable radio device receives a radio signal from the wireless base station (not shown) of the mobile communication system to which this portable radio device belongs. This radio signal includes a call signal of this portable radio device or another portable radio device having the same function. The above-mentioned call signal containing a plurality of data includes a call number of a portable radio device to be called and may also include the caller number of a caller who is calling the portable radio device.

[0017] The radio signal received through the antenna 101 is supplied to a wireless section 102. The wireless section 102 carries out a signal reception process, such as frequency conversion, amplification, demodulation, and the like, to this radio signal and supplies the demodulated calling signal to a collating part 103. The collating part 103 collates the calling number included in the calling signal with a self-individual number being set up to the rewritable memory element 104 beforehand. When the numbers are identified matching based on the result of collation, the collating part 103 determines that an incoming call has been made to its own station (its own-portable radio device) and outputs an incoming call notice signal to the CPU (microprocessor) 505. The collating part 103 also searches whether or not a caller number is included in the incoming call signal, and also supplies the caller number to the CPU 105 if the number is included.

[0018] Upon reception of the above-mentioned incoming call notice signal, the CPU 5 makes the alerting part notify an incoming call. To explain this in detail, when only the incoming call notice signal has been received from the collating part 103, the CPU 105 makes the character display element 106 containing a liquid crystal display etc. display a fixed pattern while driving a ring element 109 containing a small speaker etc. with a volume and ring pattern (normal pattern) which were set up beforehand and also driving a light emitting device 107, such as light emitting diode, which emits regular light (e.g., green) in a preset pattern so as to carry out an incoming call notification.

[0019] However, when a caller number is notified with an incoming call notice signal from the collating part 103, prior to letting these alerting parts carry out an incoming call notification, the number is collated (compared) with the predetermined caller number being set up in the memory element 104 beforehand. Based on this collation, if the aforementioned two caller numbers are determined to match each other, then the CPU 105 searches to see whether the character data corresponding to the above-mentioned caller number has been stored to the memory element 104. Note that the caller number is set up and the character data is registered to the memory element 105 from the setting part 110 using a keypad or the like through the CPU 105.

[0020] When the caller number supplied by the collating part 105 and the caller number being set up in the memory element 104 agree with each other, the CPU 105 carries out an incoming call notification by making the character display element 106 display the caller number and also the character content if character data has been registered in the memory element 104, arranging the ring cycle of the ring element 109 into a pattern (called special pattern) different from the pattern used for the case when the incoming call notification is not performed, and operating a light emitting element (e.g., light emitting element 108 generating red color) generating a color (called special color) different from the color generated by the light-emitting element 107.

[0021] Fig. 2 is a figure illustrating the display example on the display plate of the character display element 106 used in this example. (a) in the figure illustrates a display example when character data is registered into the storage element 104, and (b) illustrates a display example when character data is not registered into the memory element 104.

[0022] With reference to (a), characters "ABCD..." corresponding to the caller number and the characters "call from", which is set up in a memory element 104 or the like beforehand, are displayed on the character display element 106. Needless to say that the characters corresponding to the caller number may be the name of the person or the like who owns the device carrying this caller number.

[0023] With reference to (b), "01234 --" which is the caller number and preset characters "call from" stored to the memory element 104 or the like are displayed on the character display element 106.

[0024] As described above, with the portable radio device of this invention, when the caller number extracted by the collating part 103 matches the preset caller number registered in the memory element 104, the incoming call notification is carried out in such a manner that the caller number is displayed on the character display element 106 of the aforementioned alerting part 103 or character data, such as name, registered to the memory element 104 along with the caller number, and also, at least the color emitted by the color emitting element is arranged to be a special color different from the regular color while the ring pattern provided by the ring element 109 is in a special pattern. Therefore, the user of this portable radio device can determine whether or not the caller is someone being registered to the memory element 104 only based on this incoming call notification without responding to the incoming call.

[0025] Fig. 2 is a flow chart showing the incoming call notice operation of this example.

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[0026] If the antenna 101 of this portable radio device receives a radio signal, the collating part 103 collates the calling number extracted from the demodulated calling signal with its own individual number set up in the memory element 104 so as to judge the existence of call to the self station (Step 201). If the call exists (Y in

Step 2), the collating part 103 further judges the existence of caller number in the calling signal (Step 202). If the number does not exist (N in Step 201), the collating part 103 repeats this process.

[0027] In Step 202, if the collating part 103 extracts a caller number (Y of Step 202), the CPU 105 determines whether or not the caller number is set in the memory element 104 (Step 203). If the collating part 103 cannot extract a caller number (N of Step 202), the CPU 105 usually sets the incoming call alerting parameter to a regular pattern, that is, fixed pattern (Step 208) and makes the alerting part carry out an incoming call notification (Step 207).

[0028] In Step 203, when the caller number is identified to have been set in the memory element 104 (Y of Step 203), the CPU 105 compares the caller number obtained from the collating part 103 with the caller number being set up in the memory element 104 (Step 204). When the numbers are not matching (N of Step 204) and the caller number has not been set up in Step 203 (N of Step 203), the CPU 105 arranges the character display element 106 to display a caller number while setting the ring pattern of the ring element 109 to a normal pattern and driving the light emitting element 107 (Step 110) in the regular color for carrying out the incoming call notification (Step 207).

[0029] If two caller numbers are in agreement in Step 204 (Y in Step 204), the CPU 105 checks to see whether the character data

corresponding to the above-mentioned caller number has been registered into the memory element 104 (Step 205). When the character data has been registered (Y of Step 205), the CPU 105 sets up the character data to be displayed on the character display element 106 while setting the ring pattern of the ring element 109 to a special pattern and driving the light emitting element 108 (Step 206) emitting the a special color for carrying out the incoming call notification (Step 207). If character data has not been registered (N in Step 205), the CPU 105 sets up the character display element 106 to display the caller number while setting the ring pattern of the ring element 109 to a special pattern and driving the light emitting element 108 (Step 209) to emit a special color for carrying out the incoming call notification (Step 207).

[0030] Although this example explained a portable radio device suited to a digital mobile telephone system, the portable radio device of this invention is applicable to an MCA system, ham radio, and the like as long as it is used by the mobile communication system having a radio signal transmitted from the wireless base station and includes a caller number data.

[0031] [Effect of the Invention]

As explained above, based on the method of this invention, the CPU compares the caller number sent from the collating part with the caller number set in the first memory element, and when both are in agreement, makes the alerting part carry out an incoming call

notification in a manner different from the case when both are not in agreement. Therefore, when an incoming call notification is made, a user can determine whether or not the caller is from a calling device registered to the first memory element.

[0032] Therefore, a user does not need to respond to an unwanted incoming call or unimportant incoming call when he is in a public area.

[0033] Furthermore, this invention enables a user to easily recognize the incoming call from a specific important caller with the emitted light and ring tone that are in special patterns.

#### [Brief Description of the Figures]

[Fig. 1] A block diagram of an example of this invention.

[Fig. 2] A figure showing an example of display on the display board of the character representation element 106 used in the example.

[Fig. 3] A flow chart showing the operation of incoming call notice in this example.

[Fig. 4] A block diagram of the conventional portable radio device.

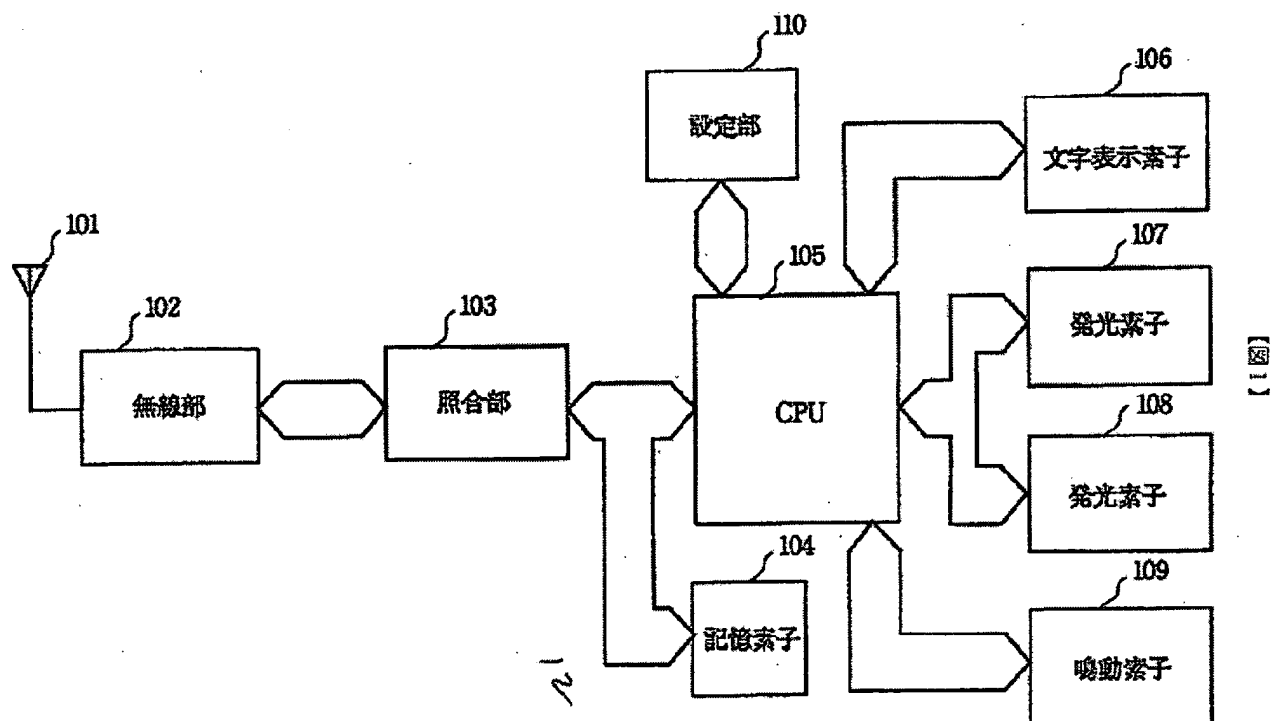
#### [Description of the Reference Numerals]

101...Antenna; 102...Wireless section; 103...Collating part;  
104...Memory element; 105...CPU; 106...Character display element;  
107, 108...Light emitting device; 109...Ringing element;  
110...Setup part





[Figure 1]



[Figure 2]

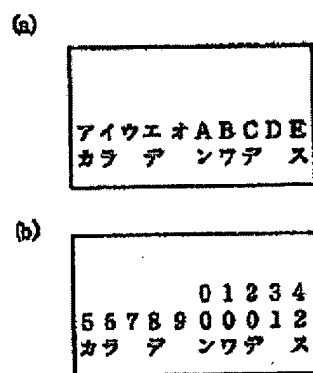
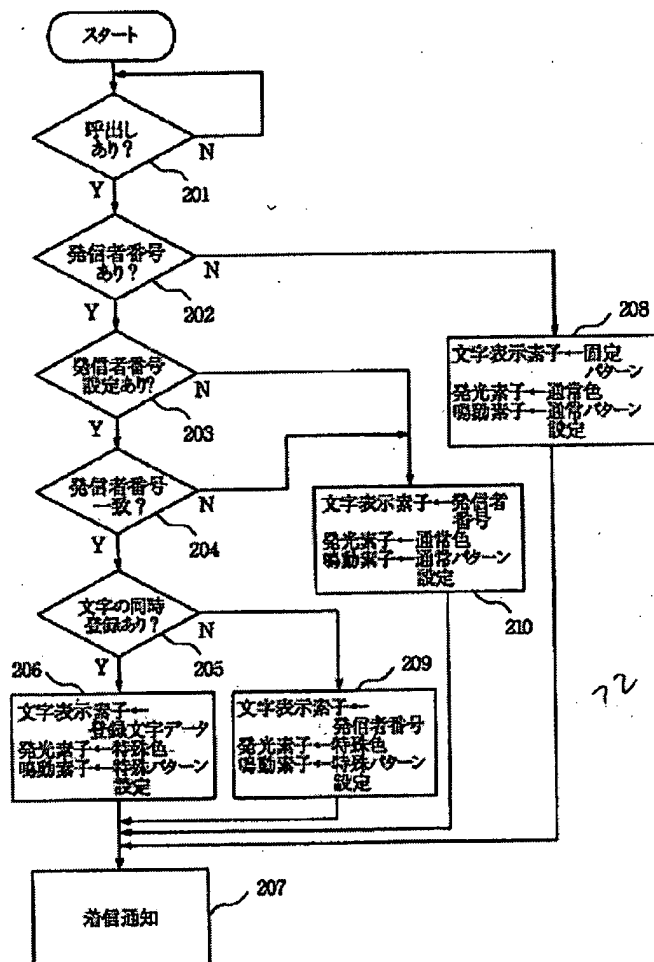


Fig. 2 Key: (a) Call from AIUEO ABCDE; (b) Call from 012345678900012

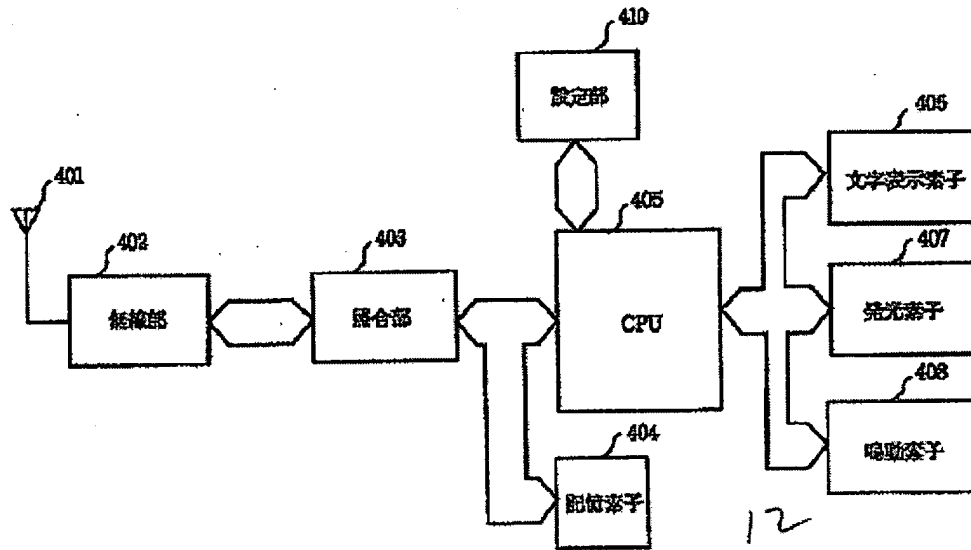
[Figure 3]



- Fig. 3 Key: A) Start; 201) Call exists?; 202) Caller number exists?; 203) Caller number set up?; 204) Caller number matches?; 205) Character were registered at the same time?;
- 206) Character display element ← Registered character data  
 Light emitting element ← Special color  
 Ring element ← Special pattern setup
- 207) Incoming call notice;
- 208) Character display element ← Fixed pattern  
 Light emitting element ← Regular color  
 Ring element ← Regular pattern setup
- 209) Character display element ← Caller number  
 Light emitting element ← Special color  
 Ring element ← Special setup pattern
- 210) Character display element ← Caller number  
 Light emitting element ← Regular color  
 Ring element ← Regular pattern setup

[Figure 4]

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Key: 402...Wireless part; 403...Collating part; 404...Memory element;  
406...Character display element; 407...Light emitting element;  
408...Drive element; 410...Setting part